

TOWARDS A SOUTHERN AFRICAN NGO POSITION ON BIOFUELS

CURES Southern Africa



Citizens United for
Renewable Energy and Sustainability
www.cures-network.org



Introduction



Small Scale Biodiesel Plant



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Mali Multifunctional platform

Southern Africa is a region with great poverty interspersed with pockets of wealth. The South African economy is one of those pockets but contained within the nation are millions of people living on the bread line without access to modern services. The Millennium Developments Goals (MDGs) have set ambitious targets that the region is striving to achieve, but the United Nations reports are discouraging about the possibility of achieving these goals.

Biofuels are being seen as an important strategy for the south in general, countries with abundant sunshine and what appear to be vast tracts of underutilized land. Southern Africa in general has great potential for engaging with biofuels programmes, particularly in the more northern countries where water and arable land is more abundant and the climate less seasonal with less frost. The region is very variable in its geography and climate and while some have abundant resources others have less. South Africa, Swaziland and Namibia are not water rich, nor do they have vast areas of arable land, so some counties have far less ability to develop an intensive biofuel programme. Other Southern African countries with more water and arable land may find it easier to develop an intensive programme.

A group of people representing a variety of NGOs assisted by academics from Southern African countries gathered together to develop a common position on biofuels. The details of the participants and the organizations can be found on the more detailed paper located on the CURES web site www.cures-network.org. This group does not pretend to represent all the views of NGOs in Southern Africa, but represents a consensus view that could arguably be that of broad based

environmental NGOs. This is the dynamic document discussed by the group, which will be used to create awareness and workshops throughout the region of Southern Africa. Over time it may develop as views become more sophisticated, as government strategies become clearer and as issues arise that were not initially considered. It can be considered a "work- in progress" that will help inform governments from the south on some of the issues of concern to environmental NGOs. We have proactively tried to look at a programme that NGOs could support, that would address some of our greater concerns in Southern Africa, being social, economic and environmental injustice. We think, if handled correctly and with the right level of capacity building, support and political will, that the biofuels industry here in Southern Africa could have positive impacts on poverty alleviation. But we caution against taking a traditional industrial strategy approach that continues to marginalize small scale farmers, further entrench industrial agricultural practices and ride roughshod over the rights of indigenous peoples. If the latter approach is taken, we will see greater poverty and injustice than even exists today.

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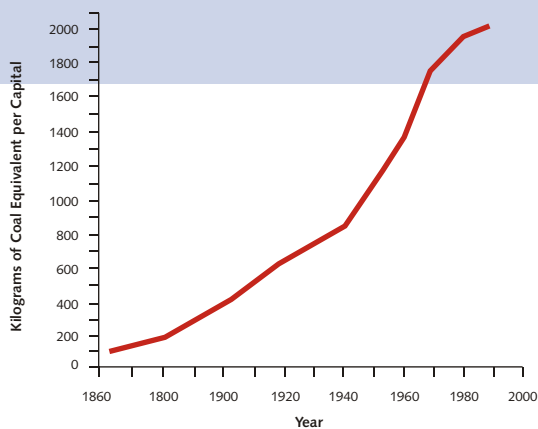
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Context

Today's modern industrial world is dominated by the burning of fossil fuels. The past 150 years or so has seen unprecedented growth in production and consumption made possible by access to cheap high calorific energy found in oil, gas and coal.

The Growth in Energy Consumption per Person



A day's human work is equal in energy terms to about 40 grams of oil, a couple of dessertspoons full, an amount that costs around 21 cents in South Africa today. A 40 litre fill-up at a petrol station provides the energy equivalent of about four years of human manual work. The access to such "powerful" energy has been the main driver of economic growth in the developed world over the past 150 years or so of the industrial era.

But global populations have had unequal access to this energy and vast parts of Africa are still living in darkness. Biomass remains the main fuel for most of Sub Saharan Africa where modern energy services are merely a dream by rapidly urbanising populations.

The resulting rapid growth in consumption and production in developed countries has not only caused economic and social injustice and inequities between the rich and the poor, the north and the south. It is now an accepted fact that the burning of fossil fuels is the main cause of global climate change and local air pollution problems. The latter results in immediate and often chronic health conditions like asthma, the former in a slower moving crisis that will see its main impacts taking place over decades. The poor who have produced the

least green house gases are most vulnerable to the impacts of global warming.

The party is over, a concept declared by the oil peak lobbyists to describe a world without liquid fossil fuels. The oil peak debate is not yet a consensus opinion, but certainly oil prices have made the industrial world jittery through the increasing costs of not only oil but gas and following close behind even coal. It has exposed the global vulnerability to a resource that will, in any event, decline due to its non renewable basis and so the inevitable is being realized through shortages and market linked price increases. South Africa may be spared the worst brunt of this impact because of its large reserves of coal which, through the Sasol liquification process provides some liquid fossil fuels for its transport and agriculture sectors, though with significantly higher CO₂ and pollutant emissions than crude oil based liquid fuels. Food price increases have already demonstrated that the poor in Sub Saharan African countries will not be spared, even in South Africa. What must be on the mind of politicians in developing countries is how economic growth will be possible without access to cheap fossil fuels. It seems that nations like China have clearly understood the limited nature of fossil fuels and are investing heavily in all kinds of energy supply, including renewable energy, to drive its 9% economic growth.

There is no real solution to the problems facing human kind except for the world to stop burning fossil fuels at the rate at which it is doing so. While it is beyond the scope of this paper to fully describe the fossil free world that we envisage, it is the primary principle behind the qualified support that the NGO community makes towards the development of a biofuels industry in Southern Africa. Energy efficiency and the development of a decentralised renewable energy economy are seen as the primary options for Southern Africa to drive its post modern economy in a direction that reflects the need to be more inclusive and create greater self reliance in local economies. This paper will take the reader through the description of how a biofuels industry can be developed that will create rural regeneration, integrated sustainable local economic development and bring energy to the poor.



A Pro-poor Socially, Economically and Environmentally just approach to Biofuels.

This section explains the main issues of concern and interest to southern NGOs. Throughout this section, we will deal with each issue both from a concerns and a potential opportunities basis. We may describe what we don't want to see, but therein you will also find reference to things we do want to see. From this it is hoped that a pro-poor biofuels strategy will start to clearly emerge.

Food for Fuel

The food or fuel debate is one of the most highly publicized debates in the biofuel industry and one of the most complex and controversial. One of the biggest criticisms of the biofuels sector is that it could contribute to a shortage of food. This could happen if there is competition for arable land where food is grown, or if there is competition for the crops themselves. The Southern African perspective might differ to other regions of the world as maize could be a major feedstock for biofuels yet it is the staple diet of greater than 80% of the population and all of the poorest citizens. We therefore are not concerned with the global issue of food stockpiling and dumping, but of retaining food security within the region, as produced by its people. Countries like Zambia produce 80% of all their food through small scale farmers. A conversion of these farms to the production of energy crops would be devastating to the food economy and security. Other countries like South Africa and Namibia have limited arable land and in the former case have achieved reasonably good local food production that should be maintained. Temporary surpluses do not suggest permanent feedstock and climate variability is common in the region and will be exacerbated by climate change. Maize is a notoriously difficult crop, having surpluses one year and deficits the other and it is sensitive to drought during its growing season. It might be better to look at the sugar industry which has consistent and permanent surpluses that are used for export that could be diverted towards the biofuels industry.

Position: That the current productive land is left unchanged and not subverted to the growing of feedstock for biofuels unless it utilizes a surplus that is stable and consistent within climate variabilities. A biofuels strategy should therefore focus on land that is underutilised and on crops that do not require arable

land or vast tracts of virgin land to be cleared.

Water

Some Southern African countries are water poor, in particular South Africa, Namibia and Swaziland. South Africa and Swaziland for instance are currently experiencing water scarcity but this is daily reality of Namibia. The UN recommends a resource of 1700m³ of water per person per year but some Southern African countries like South Africa have less (1200m³), with the agricultural sector in SA using 51% of all available water for irrigation of 1.3 million hectares which produces only 25% of the nation's agricultural output. Competition for water between agriculture and other sectors is intensifying as the Millenium Development Goals are being rolled out in Southern Africa and some catchments are already over-allocated. Additionally, the biofuels processing sector, even if the processes are small scale, will use water. There is likely to be a competition between the forestry sector and the biofuels sector for water and on a balance, if the biofuels programme is pro poor and assists with rural regeneration, thought should be given to giving it preference over the some of the less beneficial and unsustainable forestry programmes. In some instances perennial crops could assist with reducing desertification and thus help the overall water balances in an area.

Position: That the biofuels industry is not allowed to expand irrigated lands beyond existing capacity, but may be developed for rain fed areas only – and here only after a careful study of impacts in the remainder of the concerned catchment. Processes, including agriculture, must be water conserving and efficient and practice the three R's: Reduction, Reuse and Recycling. Catchment management agencies should be capacitated to deal with water management issues around the entire biofuels life cycle. Research into the impacts of various crops in particular catchments is urgently needed on a more comprehensive basis to determine the projected outcome of intensive growing.

Energy Balances

Some crop-biofuel combinations have excellent energy balances and others poor energy balances. Very few, if

any, scientific studies have been carried out in Southern Africa to calculate the energy balances for crops in the region based on local yields. Without a positive energy balance, the process of growing crops for biofuels is pointless and will lead to greater ecological damage than digging up and burning fossil fuels. If high energy balances are demanded this will result in better farming and industrial practice. Conservation agriculture practices as well as biofuels-crop combinations where the crop brings in its own bioenergy source for processing (e.g. sugarcane bagasse) result in better energy balances.

Position: No crop with an energy balance of less than 1:3 should be considered as this will allow for poorer than expected crop yields from drought conditions and a greater climate and energy security benefit for the nation.

Life Cycle Analysis

So much in the modern world is done without looking at the far reaching and integrated consequences of our actions. We work in silos with environmental issues seen as being separate from economic and social/poverty issues. Environmental impact assessments have gone some way toward addressing that, but a full life cycle analysis of a process is a far more integrated approach. In this approach for biofuels, one would look not only at the impacts of the growing process, but those on the local community and the farmer herself. It would examine the entire life cycle of the biofuels process, from farming inputs, crop types, on-farm activities, outputs including wastes, transport issues and processing, while all the time considering the social, economic and environmental consequences of the life cycle.

Position: A full life cycle analysis approach should be taken when dealing with the allocation of permits for the biofuels industry.

Genetically Modified Crops

Genetically modified (GM) crops have long been controversial in Southern Africa. Zambia banned import of US donated surplus GM maize because it had not established a Biosafety control system and feared genetic

contamination of organic food export crops. In South Africa legislation on the introduction of GMOs is lax, and requires no labeling or segregation of crops. However, there is serious misgiving in the small farming sector, among faith based groups and the environmental movements about the rapid spread of GMOs into the food chain. Not enough research has been done on questions of the impact of GM crops on human and animal health and the environment. In view of this, the precautionary principle (included within South African environmental legislation) should apply. If GM crops are used to make biofuels, co-products are likely to enter the food chain as animal feedstock.

Position: GMOs should not be used in the process of making biofuels

Land Use

Developing a biofuels sector that does not compromise food security will require making more land available. Land is prized in Africa, and much of it is indigenously owned. Some countries that were colonised still have a deep entrenchment of the old colonial style land ownership patterns. Governments in Southern Africa are taking proactive approaches to land redistribution. South Africa for instance is about to roll out an extensive land redistribution process involving 25 million hectares of land. This is significant and may be important for the biofuels sector. However, in many parts of Africa, poor desperate communities are, or have been, coerced into "partnerships" with unscrupulous investors that divest them of land use rights by retaining the right to biofuel crops and beneficiation. This will further impoverish the poor.

Position: Capacity building of land redistribution beneficiaries and government intervention to protect the rights of indigenous ownership of land and crops. Further, development of best practice biofuels projects with land redistribution beneficiaries so as to harness new income opportunities that also serve to improve the land.



A Pro-poor Socially, Economically and Environmentally just approach to Biofuels.

Farming Practices

NGOs have consistently and repeatedly highlighted the harmful practices of industrial farming. High input farming uses considerable amounts of fossil fuels through tilling, ploughing, sowing, harvesting and farm inputs like fertilizer and pesticides. Attempts to introduce conservation agriculture into some of the more wealthy nations where commercial farmers operate is continuing to prove difficult, although many Southern African countries, where small scale farming is prevalent, practice low input farming in order to save on costs. Commercial farmers in this region rarely practice conservation agriculture. Improved farming practice is not the sole responsibility of the energy feedstock farmers, but the responsibility of all farmers, and NGOs will continue to monitor farming practices throughout the agricultural sector. Monocropping is considered poor farming practice as it depletes the soil of nutrients and destroys the natural biodiversity in an area. Rotational cropping, while supporting an intercropping farming system, not only improves yields by up to 30% but improves soil life, reduces the need for fertilizers and pesticides which contribute to reduced leaching and combats desertification and land degradation.

Position: Like all crops, energy crops should be grown through Conservation farming techniques and intercropping practices.

Crop Types

It is difficult to make generalities about biofuels when there are so many feedstocks that have a great deal of variety and variability in, amongst other things, climate and rain fall needs, soil preferences, energy balances, ecological impacts, suitability and appropriateness. However, we have developed a hierarchy of preferences for biofuels feedstocks based on some of the key issues mentioned above. We favour the use of waste material first for making biofuels as this will assist us to solve our waste problems. A typical city of a million people will generate enough waste to produce 150 million litres of bioethanol per year. We identify some crops, although still in a relatively pilot phases as having good potential and so we advocate the research of algae as an oil

producer to be prioritized. Finally, we favour perennial crops over annual crops because of their ability to stabilize soils, prevent desertification, survive better in drought conditions and they generally have better energy balances through reduced annual inputs. They also have greater flexibility within the farm environment for supporting a food forest system, often called intercropping. They are also suitable for small scale farmers if adequate financing can be arranged to cover the capital inputs in the start up phase which are high but with the benefit of lower annual crops thereafter. Well adapted perennial crops grown in the appropriate areas may require irrigation for a short while, but thereafter can be rainfed. Perennial crops can also be grown in non arable land. We propose a system that favours crops that have multiple uses, where co-products can provide the greatest opportunity for rural economic livelihood diversification. Hemp plants, for instance, have high yields per ha, they may only produce small amounts of oil but they provide a mixed use approach that is in line with the pro poor strategy. Hemp provides soap, linens, building materials raw material for making plastic alternatives and medicines. NGOs are opposed to some crop types because of their inherently destructive nature, such as sugar beet that needs to be rotated once in five years and thus can only be grown continuously with massive inputs of chemical fertilisers due to its large toll on the soil nutrients. Crops that do not support intercropping easily should not be supported. Further research by organizations like SANBI (South African National Biodiversity Institute) could assist in identifying local species that can be farmed as crops that have the greatest benefit for the local community in terms of diversification and adaptability of uses.

Position: Favor a hierarchical approach, with waste first, followed by high yield low input, low degrading crop types, such as Algae and finally perennial crops. Annual crops should not be supported as energy crops with particular reference to those that exert a high toll on the land. Crops that yield the greatest diversity of use within a rural local economy should receive preference.

Governance and Regulations, Taxes and Incentives

The best way for government to support an activity is through policy, regulations, tax breaks and incentives. In this way government can guide the process towards the objectives it wants to achieve. Already some governments have done this with biofuels, like South Africa, where there is a 40% levy reduction on fuel tax (amounting to 40c/litre). In fact if you are a small scale producer you are getting a 100% fuel levy reduction as if you produce a maximum of 300 000 litres, you pay no levy. This has stimulated some activity in the farming community, mainly amongst commercial farmers who are concerned about fuel prices. Brazil has an interesting policy, it is called the social seal and a certain percentage of all biodiesel purchased for sale at commercial refueling areas must be sourced from small scale farmers and government assists in creating the partnerships needed to make this happen. It is difficult to establish a new industry without incentives, but small scale farmers will particularly struggle without access to finance for new equipment. In general tax incentives tend to favour the rich and reducing the tax levy will mainly support commercial farmers and not small scale farmers. It will be fair to create incentives that favour the small scale farmer alongside other forms of tax incentives and could, for instance, be done on the basis of a per job created or worker employed. Government could also support small scale farmers activities through special once off capital grants. Grant making can be done in ways that protect the farmers or farmers groups from exploitation by the unscrupulous investors. Equipment should not be limited to processing but also cover equipment that local communities can use to convert the fuels into energy that can be used by poor rural communities. Examples of this are the Mali Multifunctional Platform that can use vegetable oil to do many things for a community such as generate electricity or do heavy mechanical work. Another example is equipment needed to make ethanol gel and package it for use by rural livelihoods. Care must be taken within those farming nations where food security is in the hands of the small scale farmers, like in Zambia. Incentives for biofuels may make the farmers shift to biofuel production away from food production thereby threatening the nation's food security.

Microcredit schemes could be utilized for assisting small scale farmers to get financial support for their activities.

Position: Provide equity within the government taxes incentives processes for biofuels by extending benefits to interventions that help small scale farmers and micro processes. Develop grants that target capital infrastructure costs for both processing equipment and that which utilizes the fuel generated as an energy source for communities. Careful analysis of the possible outcome of subsidies should be taken on the basis of a particular nation's agro economy. Every nation should find a suitable regulatory authority to oversee the biofuels industry and help build capacity. In South Africa this task could be done by NERSA (National Energy Regulator of SA). Greater emphasis needs to be placed on the creation of micro credit schemes, particularly targeting women.

Environmental Quality and Health

Apart from the production aspect of energy crops, the processing side can also generate toxic materials. For instance, the waste from the processing of sugar cane to bioethanol, called vinnase, is highly toxic to river systems and so special guidelines might be required for new waste streams and types. Smaller enterprises have special needs particularly when dealing with the health issues related to biodiesel production when using methanol, but waste management issues will also impact on local communities if not dealt with correctly. Even the burning of biofuels can produce pollution, although less than that of fossil fuels with the exception of the nitrous oxides which are as high from biofuels as those from the exhausts of cars using fossil fuels.

Position: A full EIA should be required for all medium to large scale processing plants to determine the extent of pollution plumes and potential waste streams and how they can be managed. For small scale and micro systems an appropriate level intervention should be assessed and developed with a concurrent capacity building and training programme.



A Pro-poor Socially, Economically and Environmentally just approach to Biofuels.

Biodiversity

The issues around biofuels and the conservation of biodiversity are similar to that for all land use changes. These issues will be more pertinent for some countries that have more arable land that is currently under biodiversity conservation than others. Rain forests in particular are under threat in many parts of the world from clearing for the growing of some energy crops, in particular Soya that can grow under these particular climates and soil conditions. For some countries, like South Africa and Namibia that do not have a lot of arable land but do still have extensive grasslands in a virtually pristine condition, the second generation of biofuels from cellulosic lignin processes carry the greatest threat. Grasslands will provide excellent feedstock for these developing processes and it is possible that areas that have been previously left undisturbed will be cultivated. This could disturb sensitive habitats or even destroy them. Systems to care for these areas and processes should be developed to ensure that utilisation and protection is sustainable where necessary.

Position: Maintaining biodiversity is an important part of protecting the global ecosystem that humans rely on and so care must be taken to develop processes that enable sustainable utilization of protected and even unprotected conservation-worthy habitats and ecosystems.

Targets

Targets are usually a good way to stimulate a market and provide certainty to the producers, in this case biofuel producers. Without targets there is no responsibility for the fuel suppliers to adapt their system for biofuels or take on the additional challenges that face fuel service providers with particular reference to bioethanol. However, setting too high a target in the beginning can distort the market and drive processing in the wrong way towards unintended outcomes.

Position: We suggest a small target to start with, say 5% of petrol and diesel to be produced from biofuels, with a full assessment after a year of the impacts that this target has had on the desired outcomes. Given the significant concerns we have around biofuels if produced

on a large scale (e.g. water use, biodiversity impacts), and the fact that even a 5% biofuels target will already redirect very significant sums of money to the rural economy, we call for a conservative approach to biofuels.

Institutional arrangements

In order to achieve the objectives of a pro poor strategy, institutional issues will need to be addressed. Co-operatives have been shown to create the greatest number of benefits for local communities through the shared vision and co-operative nature of its governance.

Position: Co-operatives in rural areas should be strengthened and capacity built to set up such institutions for the pro poor biofuel strategy.

Conclusion

The participants of the development of this paper give their qualified support for a biofuels strategy. We feel that biofuels could provide an economic stimulus to rural poor economies that, if done correctly, could have benefits way beyond the simple production of biofuels for the motorized vehicle fuel market. Biofuels have many stationary applications, as seen through their use in the Mali Multifunctional platform and in ethanol gel. The greatest benefit will be in bringing energy directly to the poor, through their own production, in rural areas using their own land and resources. If the right crops are promoted, there are secondary benefits from co-products like livestock feed, better human nutrition, textiles, medicines, building materials, fertilisers amongst the many examples. Access to energy, a key objective in Africa by all of its governments will also enable beneficiaries to be more productive and in that way enter mainstream economies. Governments in Southern Africa need to be aware of some of the challenges facing the industry as well as potential risks to their people if the strategy is not implemented in a pro poor way. The priority for any biofuel strategy in Southern Africa should be to provide energy for local communities first and thereafter for their own nation. A pro poor biofuels strategy can be found on the CURES website at www.cures-network.org.

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